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EXHIBIT E1

CHAPTER 94 REPORT FOR 2020  
WILLISTOWN TOWNSHIP

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**WILLISTOWN TOWNSHIP**  
CHESTER COUNTY, PENNSYLVANIA

# **PENN'S PRESERVE WWTP**

## **CHAPTER 94 MUNICIPAL WASTELOAD MANAGEMENT ANNUAL REPORT**

**FOR CALENDAR YEAR 2020**

This annual report is prepared for compliance with Chapter 94 of Title 25 of the Pennsylvania Code.

Prepared by:



Entech Engineering, Inc.  
201 Penn Street | PO Box 32 | Reading, PA 19603-0032  
(p) 610.373.6667 (f) 610.373.7537

**Project No. 7155.019**

**Dated: March 31, 2021**

**WILLISTOWN TOWNSHIP  
PENN'S PRESERVE WASTEWATER TREATMENT PLANT  
CHAPTER 94 MUNICIPAL WASTELOAD MANAGEMENT ANNUAL REPORT  
FOR CALENDAR YEAR 2020  
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## **SECTION 1**

### **CHAPTER 94 MUNICIPAL WASTELOAD MANAGEMENT ANNUAL REPORT (PADEP FORM 3800-FM-BPNPSM0507)**



## CHAPTER 94 MUNICIPAL WASTELOAD MANAGEMENT ANNUAL REPORT

**For Calendar Year: 2020**

- ☒ Permittee is owner and/or operator of a POTW or other sewage treatment facility
- ☐ Permittee is owner and/or operator of a collection system tributary to a POTW not owned/operated by permittee

### GENERAL INFORMATION

Permittee Name:	<b>Willistown Township</b>	Permit No.:	<b>PA1596405</b>
Mailing Address:	<b>688 Sugartown Road</b>	Effective Date:	<b>March 1, 2020</b>
City, State, Zip:	<b>Malvern, PA 19355-3302</b>	Expiration Date:	<b>February 28, 2025</b>
Contact Person:	<b>Sally Slook</b>	Renewal Due Date:	<b>September 1, 2024</b>
Title:	<b>Township Manager</b>	Municipality:	<b>Willistown Township</b>
Phone:	<b>610-647-5300</b>	County:	<b>Chester</b>
Email:	<b>sslook@willistown.pa.us</b>	Consultant Name:	<b>Entech Engineering, Inc.</b>

### CHAPTER 94 REPORT COMPONENTS

1. Attach to this report a line graph depicting the monthly average flows (expressed in MGD) for each month for the past 5 years and projecting the flows for the next 5 years. The graph must also include a line depicting the hydraulic design capacity per the WQM permit. (25 Pa. Code § 94.12(a)(1))

**Check the appropriate boxes:**

- ☒ Line graph for flows attached (**Attachment A**)
- ☒ DEP Chapter 94 Spreadsheet used (**Attachment A**)
- ☐ Section 1 is not applicable (report is for a collection system).

2. Attach to this report a line graph depicting the monthly average organic loads (express as lbs BOD5/day) for each month for the past 5 years and projecting the organic loads for the next 5 years. The graph must also include a line depicting the organic design capacity of the treatment plant per the WQM permit. (25 Pa. Code § 94.12(a)(2))

**Check the appropriate boxes:**

- ☒ Line graph for organic loads attached (**Attachment A**)
- ☒ DEP Chapter 94 Spreadsheet used (**Attachment A**)
- ☐ Section 2 is not applicable (report is for a collection system).

3. If the DEP Chapter 94 Spreadsheet was not used to determine projections, discuss the basis for the hydraulic and organic projections. In all cases, include a description of the time needed to expand the plant to meet the load projections, if necessary, and data used to support the projections should be included in an appendix to this report. (25 Pa. Code § 94.12(a)(3))

**The DEP Chapter 94 Spreadsheet was used to determine projections.**

4. Attach a map showing all sewer extensions constructed within the past calendar year, sewer extensions approved or exempted in the past year in accordance with Act 537 and Chapter 71, but not yet constructed, and all known proposed projects which require public sewers but are in the preliminary planning stages. The map must be accompanied by a list summarizing each extension or project and the population to be served by the extension or project. If a sewer extension approval or proposed project includes schedules describing how the project will be completed over time, the listing should include that information and the effect this build-out-rate will have on populations served. (25 Pa. Code § 94.12(a)(4))

**Check the appropriate boxes:**

- ☐ Map showing sewer extensions constructed, approved/exempted but not yet constructed, and proposed projects attached (**Attachment** )
- ☐ List summarizing each extension or project attached (**Attachment** )
- ☐ Schedules describing how each project will be completed over time and effects attached (**Attachment** )

**Comments:**

**There were no sewer extensions constructed within the past calendar year, and no future sewer extensions are anticipated. The Penn's Preserve Wastewater Treatment Plant (WWTP) receives flow from two (2) developments known as Willistown Chase and Penn's Preserve. Both of these developments are completely built-out. There are no plans to expand the service area of the Penn's Preserve sewer system.**

5. Discuss the permittee's program for sewer system monitoring, maintenance, repair and rehabilitation, including routine and special activities, personnel and equipment used, sampling frequency, quality assurance, data analyses, infiltration/inflow monitoring, and, where applicable, maintenance and control of combined sewer regulators during the past year. Attach a separate sheet if necessary. (25 Pa. Code § 94.12(a)(5))

**Comments:**

An operator inspects the Penn's Preserve Wastewater Treatment Plant (WWTP) an average of three (3) times per week. The operator's responsibilities include not only operating the system, but also cleaning the bar screen, checking the aerators, replacing inoperable spray nozzles, setting up and completing sampling events, and recording the pH. Routine maintenance is performed on all equipment according to the manufacturer's recommended guidelines. All equipment is tested on a regular basis to ensure it is operating properly.

Effluent sampling services are provided by Brandywine Science Center of Kennett Square, PA. Testing occurs once or twice a month, depending on permit requirements. The influent is sampled a minimum of once per month, but usually is sampled twice monthly. The effluent is sampled a minimum of once per month. There are seven (7) monitoring wells, which are tested quarterly. Monitoring well services are provided by Analytical Laboratories, Inc. of Chalfont, PA.

During the spring and summer months, aquatic plant life, particularly algae and duckweed, has presented a challenge. In order to meet effluent permit limits, the WWTP operator treated the lagoons with Cygnet solution, which acts as a dye to inhibit light to the algae and duckweed.

6. Discuss the condition of the sewer system including portions of the system where conveyance capacity is being exceeded or will be exceeded in the next 5 years and portions where rehabilitation or cleaning is needed or is underway to maintain the integrity of the system and prevent or eliminate bypassing, CSOs, SSOs, excessive infiltration and other system problems. Attach a separate sheet if necessary. (25 Pa. Code § 94.12(a)(6))

**Check the appropriate boxes:**

- ☐ System experienced capacity-related bypassing, SSOs or surcharging during the report year. On a separate sheet, list the date, location, and reason for each bypass, SSO or surcharge event.
- ☒ System did not experience capacity-related bypassing, SSOs or surcharging during the report year.

**Comments:**

The sewer system is in good condition. There are no portions of the system where conveyance capacity is being exceeded or will be exceeded in the next 5 years. There are no portions of the sewer system where rehabilitation or cleaning is needed or is underway to maintain the integrity of the system or eliminate bypassing, CSOs, SSOs, excessive infiltration, or other system problems.

7. Attach a discussion on the condition of sewage pumping (pump) stations. Include a comparison of the maximum pumping rate with present maximum flows and the projected 2-year maximum flows for each station. (25 Pa. Code § 94.12(a)(7))

**Check the appropriate boxes:**

- ☐ The collection system does not contain pump stations
- ☒ The collection system does contain pump stations (Number – 1)
- ☒ Discussion of condition of each pump station attached (Attachment B)

8. If the sewage collection system receives industrial wastes (i.e., non-sanitary wastes), attach a report with the information listed below. (25 Pa. Code § 94.12(a)(8))
- a. A copy of any ordinance or regulation governing industrial waste discharges to the sewer system or a copy of amendments adopted since the initial submission of the ordinance or regulation under Chapter 94, if it has not previously been submitted.
  - b. A discussion of the permittee's or municipality's program for surveillance and monitoring of industrial waste discharges into the sewer system during the past year.
  - c. A discussion of specific problems in the sewer system or at the plant, known or suspected to be caused by industrial waste discharges and a summary of the steps being taken to alleviate or eliminate the problems. The discussion shall include a list of industries known to be discharging wastes which create problems in the plant or in the sewer system and action taken to eliminate the problem or prevent its recurrence. The report may describe pollution prevention techniques in the summary of steps taken to alleviate current problems caused by industrial waste dischargers and in actions taken to eliminate or prevent potential or recurring problems caused by industrial waste dischargers.

**Check the appropriate boxes:**

- ☐ Industrial waste report as described in 8 a., b. and c. attached (**Attachment** )
- ☐ Industrial pretreatment report as required in an NPDES permit attached (**Attachment** )

**Comments:**

**Neither an industrial waste report nor an industrial pretreatment report are required for this facility. There are no industrial wastes discharged to the Penn's Preserve sewer system.**

9. Existing or Projected Overload.

**Check the appropriate boxes:**

- ☒ This report demonstrates an existing hydraulic overload condition.
- ☐ This report demonstrates a projected hydraulic overload condition.
- ☒ This report demonstrates an existing organic overload condition.
- ☒ This report demonstrates a projected organic overload condition.

If one or more boxes above have been checked, attach a Corrective Action Plan (CAP) to reduce or eliminate present or projected overloaded conditions under §§ 94.21 and/or 94.22 (relating to existing overload and projected overload). (25 Pa. Code § 94.12(a)(9))

- ☒ Corrective Action Plan attached (**Attachment C**)

10. Where required by the NPDES permit, attach a Sewage Sludge Management inventory that demonstrates a mass balance of solids coming in and leaving the facility over the previous calendar year.

- ☐ Sewage Sludge Management Inventory attached (**Attachment** )

**Comments:**

**A Sewage Sludge Management inventory is not required for this facility.**

11. For facilities with CSOs and where required by the NPDES permit, attach an Annual CSO Report (including satellite combined sewer systems).

☐ Annual CSO Report attached (Attachment )

**Comments:**

**An Annual CSO Report is not required for this facility. There are no combined sewers in the system.**

12. For POTWs, attach a calibration report documenting that flow measuring, indicating and recording equipment has been calibrated annually. (25 Pa. Code § 94.13(b))

☒ Flow calibration report attached (Attachment D)

**RESPONSIBLE OFFICIAL CERTIFICATION**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

**Sally Slook**

Name of Responsible Official

**610-647-5300**

Telephone No.

Signature

Date

**PREPARER CERTIFICATION**

I certify under penalty of law that this document and all attachments were prepared by me or otherwise under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

**Daniel Fortak**

Name of Preparer

**610-373-6667**

Telephone No.

Signature

Date

## **ATTACHMENT A**

### **PADEP CHAPTER 94 SPREADSHEET & GRAPHS**

**PADEP Chapter 94 Spreadsheet  
Sewage Treatment Plants**

Reporting Year:

Facility Name:

Permit No.:

Persons/EDU:

Existing Hydraulic Design Capacity:  MGD  
 Upgrade Planned in Next 5 Years?  Year:   
 Future Hydraulic Design Capacity:  MGD

Existing Organic Design Capacity:  lbs BOD5/day  
 Upgrade Planned in Next 5 Years?  Year:   
 Future Organic Design Capacity:  lbs BOD5/day

**Monthly Average Flows for Past Five Years (MGD)**

Month	2016	2017	2018	2019	2020
January	0.031	0.029	0.029	0.05	0.045
February	0.037	0.027	0.034	0.047	0.02299
March	0.032	0.028	0.038	0.049	0.02923
April	0.031	0.032	0.036	0.041	0.02951
May	0.032	0.03	0.037	0.041	0.02855
June	0.03	0.028	0.036	0.032	0.02939
July	0.027	0.025	0.031	0.031	0.02938
August	0.026	0.027	0.036	0.028	0.03814
September	0.025	0.026	0.041	0.026	0.0322
October	0.025	0.027	0.039	0.024	0.0312
November	0.027	0.028	0.047	0.026	0.0342
December	0.029	0.029	0.049	0.028	0.04191

Annual Avg	0.029	0.028	0.038	0.035	0.032641
Max 3-Mo Avg	0.033	0.03	0.045	0.049	0.03577
Max : Avg Ratio	1.14	1.07	1.18	1.40	1.10
Existing EDUs	194.0	194.0	194.0	194.0	194.0
Flow/EDU (GPD)	149.5	144.3	195.9	180.4	168.3
Flow/Capita (GPD)	42.7	41.2	56.0	51.5	48.1
Exist. Overload?	NO	NO	NO	YES	NO

**Projected Flows for Next Five Years (MGD)**

	2021	2022	2023	2024	2025
New EDUs	0.0	0.0	0.0	0.0	0.0
New EDU Flow	0	0	0	0	0
Proj. Annual Avg	0.03253	0.03253	0.03253	0.03253	0.03253
Proj. Max 3-Mo Avg	0.03831	0.03831	0.03831	0.03831	0.03831
Proj. Overload?	NO	NO	NO	NO	NO

Show Precipitation Data on Hydraulic Graph?

**Total Monthly Precipitation for Past Five Years (Inches)**

Month	2016	2017	2018	2019	2020
January	2.64	2.91	2.85	3.92	2.6
February	4.36	1.3	6.02	3.27	2.5
March	2.01	4.26	4.74	3.85	3.94
April	1.75	3.15	3.94	3.06	3.41
May	6.65	6.33	5.21	5.22	2.54
June	1.87	4.94	3.34	7.94	3.21
July	3.88	5.35	3.06	6.03	5.53
August	1.7	6.05	4.11	2.78	8.52
September	3.52	3.86	9.76	1.16	4.25
October	2.06	3.66	3.08	3.87	4.1
November	2.17	1.3	9.03	1.16	3.87
December	2.72	1.31	6.38	5.31	5.26

**Monthly Average BOD5 Loads for Past Five Years (lbs/day)**

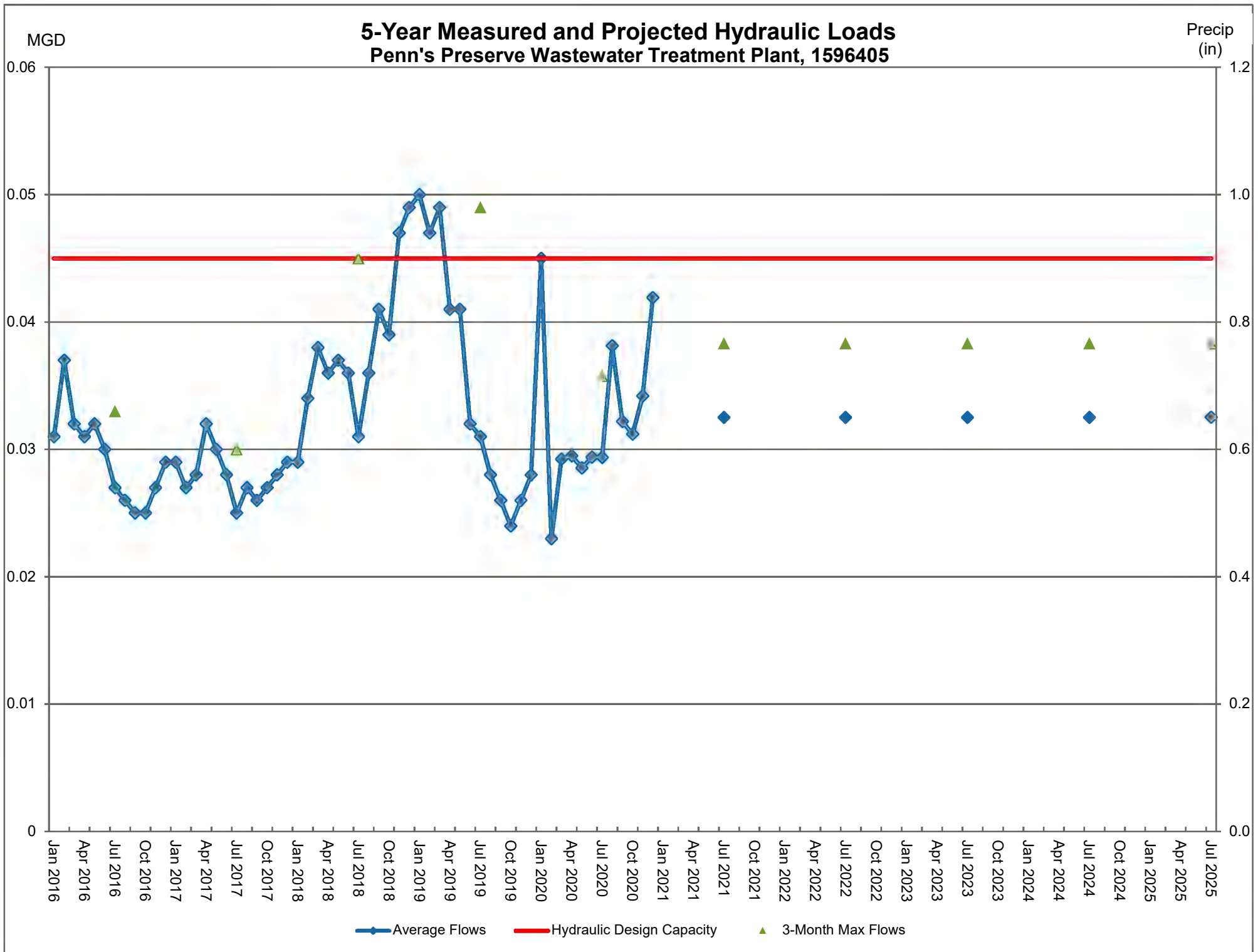
Month	2016	2017	2018	2019	2020
January	100	76	29	67	115
February	94	63	76	71	33
March	53	36	81	93	70
April	56	91	58	88	81
May	110	65	65	59	76
June	71	60	77	94	84
July	50	93	66	62	68
August	48	80	66	42	109
September	67	53	70	52	116
October	52	48	80	61	77
November	46	58	67	86	93
December	74	124	67	46	124

Annual Avg	68	71	67	68	87
Max Mo Avg	110	124	81	94	124
Max : Avg Ratio	1.61	1.76	1.21	1.37	1.43
Existing EDUs	194	194	194	194	194
Load/EDU	0.353	0.364	0.345	0.353	0.449
Load/Capita	0.101	0.104	0.098	0.101	0.128
Exist. Overload?	YES	YES	NO	YES	YES

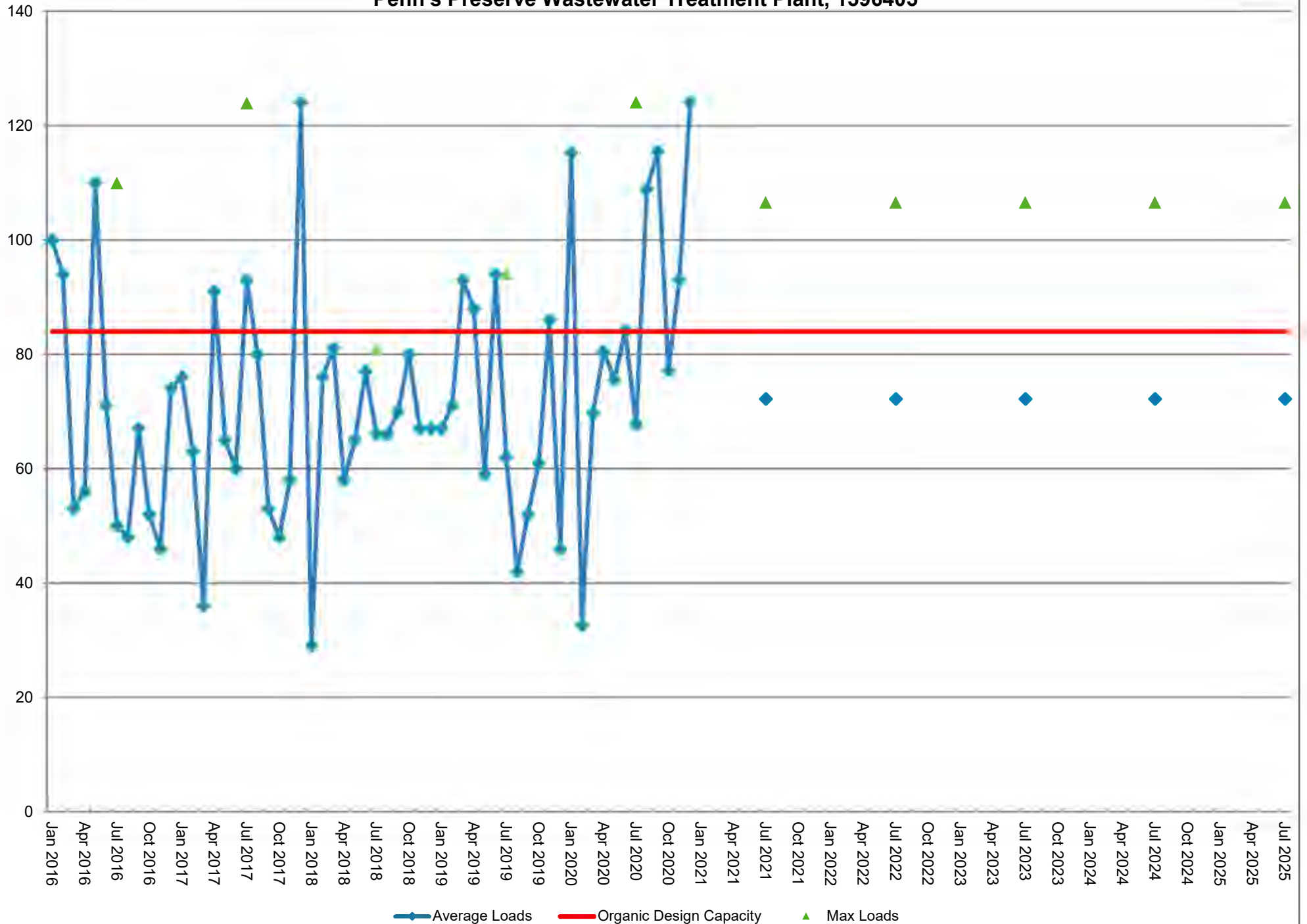
**Projected BOD5 Loads for Next Five Years (lbs/day)**

	2021	2022	2023	2024	2025
New EDUs	0	0	0	0	0
New EDU Load	0.000	0.000	0.000	0.000	0.000
Proj. Annual Avg	72	72	72	72	72
Proj. Max Avg	107	107	107	107	107
Proj. Overload?	YES	YES	YES	YES	YES

# 5-Year Measured and Projected Hydraulic Loads Penn's Preserve Wastewater Treatment Plant, 1596405



# 5-Year Measured and Projected Organic Loads Penn's Preserve Wastewater Treatment Plant, 1596405



## **ATTACHMENT B**

### **SEWAGE PUMPING STATIONS**

The Penn's Preserve wastewater system includes one (1) pumping station, which is located on the eastbound side of West Chester Pike (Route 3) across the street from the facility's spray irrigation system. The pumping station receives flow from the two (2) subdivisions served by the Penn's Preserve Wastewater Treatment Plant (WWTP), including Willistown Chase and Penn's Preserve. The pumping station is known as Pumping Station #4 within the Willistown Township sanitary sewer system, however it is the only pumping station for the Penn's Preserve WWTP and therefore it is also known as the Penn's Preserve Pumping Station.

Previously, the Penn's Preserve Pumping Station utilized two (2) sets of pumps which operated in series. The pumping station had two (2) submersible pumps, which would pump up to two (2) suction lift pumps, which would then pump the influent wastewater to the aerated lagoon. This arrangement was needed because of the depth of the pumping station. In 2019, the submersible pumps were upgraded, and the suction lift pumps were removed. The pumping station now utilizes two (2) submersible pumps that transfer the influent wastewater to the aerated lagoon.

The table below includes a comparison of the pumping station's hydraulic design capacity with the maximum flow from 2020 and the projected 2-year maximum flow. The hydraulic design capacity of the pumping station is 195 gallons per minute (GPM). The maximum daily flow in 2020 was estimated to at 0.0864 million gallons per day (MGD), or 60 GPM. The projected 2-year maximum flow is the maximum flow from 2020 with a peaking factor of 1.2, which equals 72 GPM. The pumping station is not currently hydraulically overloaded, and a hydraulic overload is not projected in the next 2 years.

<b>Pumping Station Flows – 2020</b>				
<b>Pumping Station</b>	<b>Hydraulic Design Capacity (GPM)</b>	<b>2020 Estimated Maximum Flows (GPM)</b>	<b>Estimated Projected 2-Year Maximum Flows (GPM)</b>	<b>Existing or Projected Overload?</b>
Penn's Preserve Pumping Station	195	60	72	No

## **ATTACHMENT C**

### **CORRECTIVE ACTION PLAN**

#### **Hydraulic Overload**

The PADEP Chapter 94 Spreadsheet indicates an existing hydraulic overload at the Penn's Preserve Wastewater Treatment Plant (WWTP) for 2019. Beginning in November, 2018 the WWTP experienced a spike in the influent flow. An investigation was launched to determine the source of this excess flow, which led to the discovery of an illegal storm connection in one of the manholes in the Penn's Preserve collection system. This illegal connection was plugged in March, 2019 and there have been no hydraulic overloads since that time. No hydraulic overloads are projected.

#### **Organic Overload**

The PADEP Chapter 94 Spreadsheet indicates both existing and projected organic overloads at the WWTP. This is due to ongoing sampling issues at the influent pumping station. Due to the limited volume within the influent pumping station, the sampler intake line is routinely adjusted. If the influent sample line is placed too high, it pulls fat, oil, and grease from the top of the wastewater, causing a high BOD5 result. If the line is placed too deep, it interferes with the submersible pumps. There were no violations of the effluent limit for CBOD5 established in the WQM permit in 2020, and there are no operation concerns to suggest the WWTP is legitimately organically overloaded.

## **ATTACHMENT D**

### **FLOW METER CALIBRATION REPORTS**

Influent flow to the Penn's Preserve Wastewater Treatment Plant (WWTP) is measured at the Penn's Preserve Pumping Station (also known as Pumping Station #4). WWTP discharge flow is also measured at the sprayfields. Both the influent and effluent flow meters were calibrated by The Meter Guy LLC on December 28, 2020. The calibration reports are included in this attachment.

## TheMeterGuy, LLC.

5758 GLEN OAKS DRIVE NARVON, PA 17555  
PHONE: (717) 940-1987

### \*\*\*SERVICE REPORT\*\*\*

MATT BOGGS  
WILLISTOWN TWP.  
688 SUGARTOWN ROAD  
MALVERN, PA 19355

**SERVICE DATE:** 12/28/2020  
**METER#:** C8344 AF  
**LOCATION:** SPRAYFIELDS  
**SERIAL #:** 7843652  
**MANUFACTURER:** SENSUS  
**RECORDER:** N/A  
**TRANSMITTER:** W-450  
**PRIMARY:** 4 INCH  
**MAXIMUM CAPACITY:**  
**SERVICE CONTRACT:** ANNUAL

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### \*WORK PERFORMED\*

**CLEANED EQUIPMENT:** X      **PRIMARY:** X

**\*RECORDER CALIBRATION\***      **CHECKED AT:** N/A  
**ERROR:** N/A      **CORRECTED ACCURACY:** N/A

**\*TOTALIZER CALIBRATION\***      **CHECKED AT:** 0 & OPERATING RATE  
**ERROR:** 0%      **CORRECTED ACCURACY:**  $\pm 1\%$

**\*TRANSMITTER CALIBRATION\***  
ZEROED TRANSMITTER & OPERATING RATE USING BE6000  
**ERROR:** 0%      **CORRECTED ACCURACY:**  $\pm 5\%$

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**COMMENTS:** LEFT EQUIPMENT OPERATING PROPERLY.

**SERVICE REPRESENTATIVE:** DAVID MOORE      **PERSON SEEN:**  
copies- [email: WHAGAN@WILLISTOWN.PA.US](mailto:WHAGAN@WILLISTOWN.PA.US)  
[em: mboggs@entecheng.com](mailto:mboggs@entecheng.com)

## TheMeterGuy, LLC.

5758 GLEN OAKS DRIVE NARVON, PA 17555  
PHONE: (717) 940-1987

### \*\*\*SERVICE REPORT\*\*\*

WILLISTOWN TWP.  
688 SUGARTOWN ROAD  
MALVERN, PA 19355

**SERVICE DATE:** 12/28/2020  
**METER#:** C8344 AE  
**LOCATION:** PUMP STATION 4  
**SERIAL #:** ABY003632/UR36230  
**MANUFACTURER:** ISOIL/CHESELL  
**RECORDER:** 392  
**TRANSMITTER:** ISOIL FM110  
**PRIMARY:** 4 INCH  
**MAXIMUM CAPACITY:** 500 GPM  
**SERVICE CONTRACT:** ANNUAL

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### \*WORK PERFORMED\*

**CLEANED EQUIPMENT:** X      **PRIMARY:** X

**\*RECORDER CALIBRATION\***    **CHECKED AT:** 0, 25, 50 & 100%  
**ERROR:** 0%      **CORRECTED ACCURACY:**  $\pm 1\%$

**\*TOTALIZER CALIBRATION\***    **CHECKED AT:** 0, 25, 50 & 100%  
**ERROR:** 0%      **CORRECTED ACCURACY:**  $\pm 1\%$

**\*TRANSMITTER CALIBRATION\***  
VOLUMETRIC CALIBRATION  
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**COMMENTS:** LEFT EQUIPMENT OPERATING PROPERLY.

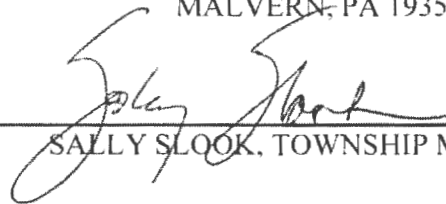
**SERVICE REPRESENTATIVE:** DAVID MOORE    **PERSON SEEN:**  
copies- [email: WHAGAN@WILLISTOWN.PA.US](mailto:WHAGAN@WILLISTOWN.PA.US)  
[em: mboggs@entecheng.com](mailto:mboggs@entecheng.com)

WILLISTOWN TOWNSHIP  
MUNICIPAL WASTELOAD MANAGEMENT REPORT  
VALLEY FORGE SEWER AUTHORITY  
DRAINAGE AREA  
CALENDAR YEAR 2020

MARCH 2021

PREPARED FOR:

WILLISTOWN TOWNSHIP  
688 SUGARTOWN ROAD  
MALVERN, PA 19355




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SALLY SLOOK, TOWNSHIP MANAGER

PREPARED BY:

CARROLL ENGINEERING CORPORATION  
949 EASTON ROAD  
WARRINGTON, PA 18976



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WILLIAM N. MALIN, P.E., VICE PRESIDENT

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### PLANS

WASTEWATER FACILITIES PLAN

## **SECTION 1**

### **INTRODUCTION**

Pursuant to Pennsylvania Chapter 94 Municipal Wasteload Management regulations and requirements, Willistown Township has prepared this 2020 Municipal Wasteload Management Annual Report for the Valley Forge Sewer Authority (VFSA) service area.

The Valley Forge Sewer Authority service area covers the northern one-third of the Township adjacent to Tredyffrin Township and Malvern Borough and generally east of Sugartown Road to the Easttown Township border. In addition, there is a small portion along the East Goshen Township Boundary that straddles Paoli Pike. Wastewater in the VFSA service area is conveyed via the Valley Creek Trunk Sewer (VCTS) to VFSA for treatment. In addition to collecting and conveying wastewater in Willistown Township, flows from East Whiteland and Malvern Borough are conveyed (wheeled flow) through Willistown to the VCTS and VFSA. The Valley Forge Sewer Authority service area is shown on the Wastewater Facilities Plan.

The Valley Forge Sewer Authority service area includes approximately 20 miles of 8” through 18” gravity sewers and 9 miles of pressure sewers. There are four municipal owned and one privately owned sewage pump stations in the VFSA service area. The private pump station is part of the Dovecote development and will be dedicated to the Township.

Wastewater from the VFSA service area enters Tredyffrin and Easttown Townships at five locations identified on the Wastewater Facilities Plan:

- Flow from Tredyffrin Township Drainage Area 1 is metered at the Cedar Hollow flow meter located on Cedar Hollow Road just north of Jacqueline Drive. Approximately 97% of all Willistown Township flow to VFSA flows through the Cedar Hollow meter.
- Seven un-metered EDU's on Central Avenue in Tredyffrin Township Drainage Area 2 connect to Tredyffrin Township's sewer system.
- Fifty-six EDU's on Plank Avenue, Paoli Pike, Richmond Drive, Wistar Road and Cobblestone Drive in Tredyffrin Township Drainage Area 3 connect directly to Tredyffrin Township's sewer system.
- Flow from Easttown Township Drainage Area 1 is metered at the Pheasant Run flow meter located in Pheasant Run Drive.
- One EDU on South Valley Road in Easttown Township Drainage Area 2 connects directly to Easttown Township's sewer system.

## **SECTION 2**

### **HYDRAULIC LOADING**

Willistown Township is allocated 1,438,000 gallons per day (GPD) of capacity in VFSA's treatment plant. In 2020, Willistown conveyed a monthly average daily flow of 1,305,107 GPD to VFSA. Currently, Willistown is using 90.8% of their allocated capacity. Flows conveyed to VFSA is summarized in Table No. 1.

The monthly average daily flow in 2020 decreased by approximately 10% (141,727 GPD). The flow reduction is attributed to the completion of sewer system repairs. Willistown's long term (January 2015 through December 2020) monthly average daily flow is 1,227,965 GPD.

In 2020, one new EDU was connected in the VFSA service area. Projected flows for the new connections for the period 2021 through 2025 are shown in Table No. 2. Flows are projected to increase by 11,000 GPD in the next 5-years.

### **SECTION 3**

#### **CONDITION OF THE SEWER SYSTEM**

Willistown's sewer system dates to the 1970's. Older portions of the system primarily consist of vitrified clay or asbestos cement pipe (VCP & ACP). New portions are PVC pipe. In 2014, the gravity sewer system was televised by a third-party contractor. In 2015 sewer defects and needed repairs were catalogued. Construction drawings for sewer repairs are being prepared. The previously identified emergency sewer repairs were completed between August 2018 and February 2019. Eight-hundred thirty feet of sewer and 6 manholes were replaced. In 2019, an additional 555' and 5 manholes were replaced.

## **SECTION 4**

### **SEWAGE PUMPING STATIONS**

There are four municipal owned and one privately owned pump stations in the VFSA service area. Pump Stations Nos. 1, 2, 4, and the privately-owned Dovecote Pump Station pump flow to Pump Station No. 3. Pump Station No. 3 pumps flow to the gravity sewer system tributary to the Cedar Hollow flow meter. The pump stations are shown on the Wastewater Facilities Plan.

Pump station flows are summarized as follows:

1. PUMP STATION No. 1:

Design Capacity:	288,000 GPD
Current 5-year Maximum Flow:	98,294 GPD
Projected 2-year Maximum Flow:	98,294 GPD

2. PUMP STATION No. 2:

Design Capacity:	720,000 GPD
Current 5-year Maximum Flow:	446,209 GPD
Projected 2-year Maximum Flow:	446,209 GPD

3. PUMP STATION No. 3:

Design Capacity:	2,880,000 GPD
Current 5-year Maximum Flow:	910,313 GPD
Projected 2-year Maximum Flow:	910,863 GPD

Current and projected pump station flows include flow from Pump Station Nos. 1, 2, 4 & Dovecote.

4. PUMP STATION No. 4:

Design Capacity: 288,000 GPD

Current 5-year Maximum Flow: 65,828 GPD

Projected 2-year Maximum Flow: 65,828 GPD

5. DOVECOTE PUMP STATION:

Pump station capacity and flow data is not currently available. There will be no additional flow in the next 2-years.

## **SECTION 5**

### **INDUSTRIAL WASTES**

Currently, there are no industrial users in the VFSA service area, nor are any planned in the future.

Table No. 1  
Willistown Township  
Valley Forge Sewer Authority Service Area  
2020 Monthly Flow Summary

Month	Metered Flow								Un-Metered Flow							
	Metered Flows			Wheeled Flows				Net Metered Flow (GPD)	Cedar Hollow Flow (MGD)	Flow Analysis z-scale	Flow Analysis Corres. Flow	Peaking Factor ADF= 1.052	Total Un-metered EDU's	Base EDU Flow 275 Gal/EDU (GPD)	Corrected Un-metered Flow (GPD)	Total Willistown Flow (GPD)
	Cedar Hollow Flow (GPD)	Pheasant Run Flow (GPD)	Total Flow (GPD)	Woodview Flow (GPD)	Tidewater Flow (GPD)	Malvern Prep Flow (GPD)	Total Flow GPD									
January	1,174,735	96,014	1,270,749	6,888	9,503	8,810	25,201	1,245,548	1.175	0.322	1.127	1.042	73	20,075	20,921	1,266,469
February	1,234,623	73,089	1,307,713	6,818	10,241	8,810	25,869	1,281,844	1.235	0.533	1.214	1.123	73	20,075	22,541	1,304,385
March	1,224,793	81,871	1,306,664	7,197	10,135	8,810	26,142	1,280,522	1.225	0.499	1.193	1.103	73	20,075	22,149	1,302,671
April	1,458,294	91,861	1,550,155	7,947	10,977	7,014	25,938	1,524,217	1.458	1.240	1.506	1.393	73	20,075	27,957	1,552,174
May	1,370,957	95,685	1,466,642	7,768	10,658	7,014	25,440	1,441,201	1.371	0.978	1.406	1.301	73	20,075	26,112	1,467,314
June	1,221,635	91,040	1,312,675	7,920	9,745	7,014	24,679	1,287,996	1.222	0.488	1.192	1.102	73	20,075	22,127	1,310,123
July	1,148,937	85,604	1,234,541	7,970	12,139	12,287	32,396	1,202,145	1.149	0.227	1.106	1.023	73	20,075	20,534	1,222,679
August	1,036,251	71,068	1,107,318	8,648	12,139	12,287	33,074	1,074,244	1.036	-0.211	1.008	0.932	73	20,075	18,717	1,092,962
September	1,260,503	86,381	1,346,884	10,477	12,673	12,287	35,437	1,311,448	1.261	0.621	1.254	1.160	73	20,075	23,279	1,334,727
October	995,847	86,381	1,082,228	9,734	13,542	8,717	31,993	1,050,236	0.996	-0.380	0.974	0.901	73	20,075	18,080	1,068,316
November	1,129,241	86,381	1,215,622	13,162	12,663	8,717	34,542	1,181,080	1.129	0.154	1.094	1.011	73	20,075	20,305	1,201,386
December	1,452,196	86,381	1,538,577	7,600	11,926	8,717	28,243	1,510,334	1.452	1.222	1.495	1.382	73	20,075	27,749	1,538,084
Average																1,305,107

Table No. 2  
Willistown Township  
5-year Flow Projections

Project Name	Status	Projected EDU's	Projected Connections				
			2021	2022	2023	2024	2025
Troutbeck Farm	Preliminary	36		12	12	12	
59 Grubb Road	Preliminary	1					
107 Central Avenue	Preliminary	1					
1 Greenbriar Lane	Preliminary	4					
2291 South Valley Road	Preliminary	4	1	1	1	1	
Projected Annual EDU's			1	13	13	13	0
Projected Annual Flow @275 gallons per EDU (GPD)			275	3,575	3,575	3,575	0
Projected Cumulative EDU's			1	14	27	40	40
Projected Cumulative flow @275 gallons per EDU (GPD)			275	3,850	7,425	11,000	11,000
Existing Average Daily Flow January 2016 - December 2020 (GPD)			1,227,956	1,227,956	1,227,956	1,227,956	1,227,956
Projected Average Daily Flow (GPD)			1,228,231	1,231,806	1,235,381	1,238,956	1,238,956

## **WASTEWATER FACILITIES PLAN**

Legend

Drainage Areas

Tredyffrin Township 1

Tredyffrin Township 2

Tredyffrin Township 3

Easttown Township 1

Easttown Township 2

Pressure Sewer

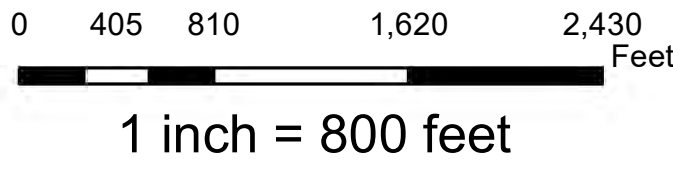
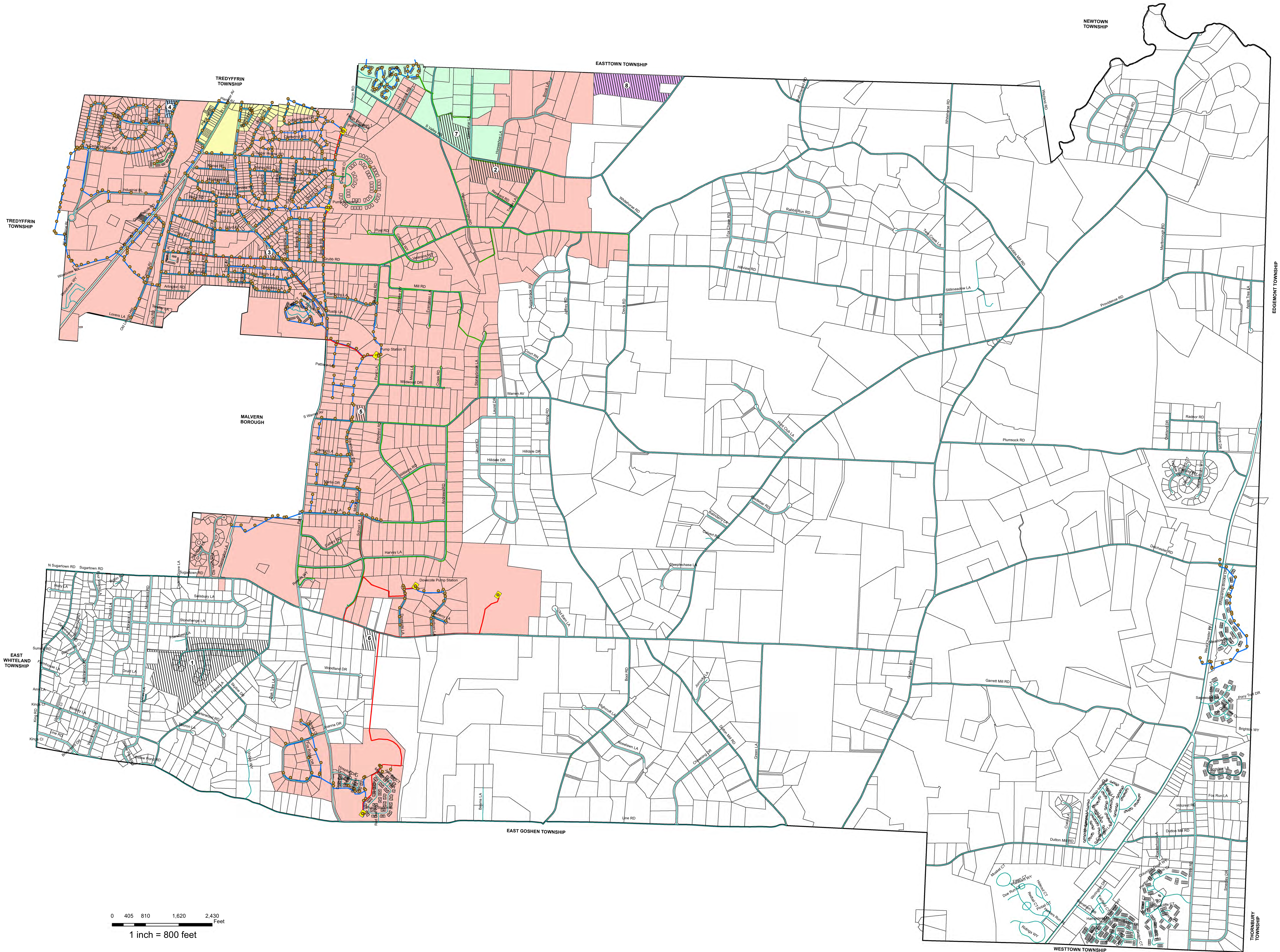
Gravity

Force Main

Manholes

Pump Stations

Map Identifier	Project Name	Status	Projected EDUs
1	Troubeck Farm	Preliminary	38
3	59 Grubb Road	Preliminary	1
4	107 Central Avenue	Preliminary	1
7	1 Greenbriar Lane	Preliminary	4
8	2291 South Valley Road	Preliminary	4



WASTEWATER FACILITIES PLAN

CHAPTER 94 REPORT

VALLEY FORGE SEWER AUTHORITY

DRAINAGE AREA

SITUATED IN:

WILLISTOWN TOWNSHIP

CHESTER COUNTY, PENNSYLVANIA

PREPARED FOR:

WILLISTOWN TOWNSHIP

688 SUGARTOWN ROAD

MALVERN, PENNSYLVANIA 19355

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DATE: 01/05/2021

SHEET NO.: 13-5002.08

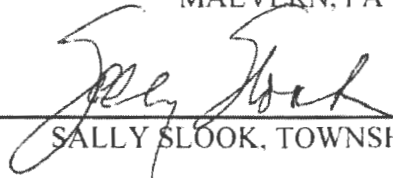
SCALE: 1" = 800'

WILLISTOWN TOWNSHIP  
MUNICIPAL WASTELOAD MANAGEMENT REPORT  
EAST GOSHEN TOWNSHIP  
RIDLEY CREEK WWTP  
SERVICE AREA  
CALENDAR YEAR 2020

MARCH 2021

PREPARED FOR:

WILLISTOWN TOWNSHIP  
688 SUGARTOWN ROAD  
MALVERN, PA 19355




---

SALLY SLOOK, TOWNSHIP MANAGER

PREPARED BY:

CARROLL ENGINEERING CORPORATION  
949 EASTON ROAD  
WARRINGTON, PA 18976



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WILLIAM N. MALIN, P.E., VICE PRESIDENT

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ITEM 4 - OVERALL SEWER SYSTEM CONDITION	1

## APPENDICES

Appendix A East Goshen Township Service Area Plans

## ITEM 1 - EXECUTIVE SUMMARY

Flow from Willistown Township is conveyed to the East Goshen Township sanitary sewer system at three (3) locations. This flow is ultimately treated at the Ridley Creek Wastewater Treatment Plant. The three locations are Line Road north of Paoli Pike, Willow Pond Road, and Wyllpen Place west of Dutton Mill Road. Four (4) homes are connected on Line Road; fourteen (14) homes are connected on Willow Pond Road; and two (2) homes are connected on Wyllpen Place. The maps included in Appendix A show the locations of the properties providing flow to East Goshen Township.

The total number of Equivalent Dwelling Units (EDUs) Connected at the end of 2018 was twenty (21). At 262.5 gallons per day (GPD) per EDU, the estimated average flow for the twenty-one (21) homes is 5,250 GPD.

The homes along Line Road and Wyllpen Place are connected to sanitary sewers owned and operated by East Goshen Township.

The sanitary sewer in Willow Pond Road is owned and operated by Willistown Township. The flow is conveyed to sewer in Pond View Lane, which is owned and operated by East Goshen Township.

## ITEM 2 - SEWER EXTENSIONS

There were no sewer extensions during 2018. Willistown Township is not currently planning any further sewer connections to East Goshen Township.

## ITEM 3 - SEWER SYTEM MAINTENANCE

Willistown Township performs basic monitoring and maintenance on the sewer in Willow Pond Road. This sewer is in good condition with no sign of inflow/infiltration. Due to the low number of homes connected to the system, the flows are not metered or sampled. Flows can be estimated from water meter readings.

Willistown Township is not responsible for maintenance of the sewer connections on Line Road or Wyllpen Place.

## ITEM 4 - OVERALL SEWER SYSTEM CONDITION

The system is in good condition. There are no portions of the system where rehabilitation or cleaning is needed, or where conveyance capacity will be exceeded in the next five (5) years.

APPENDIX A

EAST GOSHEN TOWNSHIP SERVICE AREA PLANS

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